

# EXAMPLE WILDLAND FIRE IMPLEMENTATION PLAN (WFIP)

## ADDRESSING AIR RESOURCE IMPACTS FROM WILDLAND FIRE USE SMOKE EMISSIONS

LAST UPDATED: February 1, 2008

 = DEQ Text

\*\*\*\*\*

### THIS DOCUMENT LOCATED AT:

<http://www.deq.mt.gov/AirQuality/AQinfo.asp>

\*\*\*\*\*

## Wildland Fire Implementation Plan

### Table of Contents

Fire Name	Moors Mountain Wildland Fire Use Candidate
Fire Number	MT-HNF-000045
Administrative Unit(s)	Helena Ranger District

	<i>Documentation Product</i>	<i>Needed</i>	<i>Completed</i>
WFIP Stage I:			
Strategic Fire Size-Up			✓
Decision Criteria Checklist			✓
Management Actions			✓
Periodic Fire Assessment			✓
WFIP Stage II:			
Objectives			✓
Fire Situation			✓
Management Actions			✓
Estimated Costs			✓
Periodic Fire Assessment			✓
WFIP Stage III			
Objectives			✓
MMA Definition			✓
Weather Conditions and Drought Prognosis			✓
Long-Term Risk Assessment			✓
Threats			✓
Monitoring Actions			✓
Mitigation Actions			✓
Resources Needed			✓

Contingency Plan  
 Information Plan  
 Estimated Costs  
 Post-Burn Evaluation  
 Signatures and Date  
 Periodic Fire Assessment

	✓
	✓
	✓
	✓
	✓
	✓

Appendix


### **DISCLAIMER**

*This example Wildland Fire Implementation Plan (WFIP) represents a comprehensive approach to fully disclosing the potential air quality impacts caused by smoke from Wildland Fire Use (WFU) events at the event level. The appropriate level of analysis for each WFIP Stage will vary with the size and complexity of the WFU event. Air quality information may be provided in the project environmental assessment (EA) or environmental impact statement (EIS) and simply referenced in the WFIP. Users of this document will need to decide the level of air quality analysis required for their WFU event on a case-by-case basis and cite information appropriately.*

*This example approach and WFIP outline is not required nor does it necessarily satisfy all legal requirements, including regulations associated with the State of Montana Open Burning regulations at ARM 17.8.601, et seq., or major source burn permit requirements. The Montana Department of Environmental Quality retains the discretion to restrict burning or propose alternative / additional burning techniques for minimizing smoke impacts caused by WFU events.*

*Questions, comments, or suggestions on improving this document are encouraged. Forward specific comments regarding this document to Bob Habeck, Supervisor of the Air Quality Policy & Planning Program, Montana Department of Environmental Quality, (406) 444-7305 or bhabeck@mt.gov*

## WFIP Stage I:

### *Strategic Fire Size-Up:*

<b>Fire Name</b>	Moors Mountain Wildland Fire Use Candidate		
<b>Fire Number</b>	MT-HNF-000045		
<b>Administrative Unit(s)</b>	Helena Ranger District		
<b>Start Date/Time</b>	August 23, 2008		
<b>Discovery Date/Time</b>	August 25, 2008		
<b>Current Date/Time</b>	August 25, 2008		
<b>Current Size</b>	10 Acres		
<b>Fuel Model</b>	8		
<b>Current Weather</b>	Daytime high in the 90's; 20-25% RH; ridge top winds 10-18 mph; sustained high pressure next 3-5 days;		
<b>Observed Fire Behavior</b>	Creeping / smoldering, occasional single-tree torching		
<b>Location: Legal Description(s)</b>	SE ¼, NE ¼, Section 16, T12N, R10W.		
<b>Latitude Longitude</b>	46.88994 N; 111.74005 W		
<b>Local Description</b>	South-east face of Moors Mountain at 7,734 feet elevation north of open rock fields.		
<b>FMU</b> (circle appropriate FMU situation)	WFU Approved	WFU Not Approved	
<b>Cause</b> (circle fire cause)	Natural ignition	Human Caused Ignition	
<b>Suitability for Wildland Fire Use</b> (circle situation, initials of person preparing, date/time)	Wildland Fire Use Candidate Continue with Decision Criteria Checklist	Suppression	Initials RJH Date/Time 8/26/08

# Decision Criteria Checklist

## Decision Element

Is there a threat to life, property, or public and firefighter safety that cannot be mitigated?

**DEQ NOTE:** Threats to life, property, public, and fire fighters include direct contact with smoke.

Are potential effects on cultural and natural resources outside the range of acceptable effects?

**DEQ NOTE:** Objectives and constraints include air quality and effects on natural and cultural resources. You may want to consider smoke management effects on cultural resources when burning near Indian reservations. Determine whether there is data that indicate smoke produced from this fire may be outside historical variability.

Are relative risk indicators and/or risk assessment results unacceptable to the appropriate Agency Administrator?

**DEQ NOTE:** Relative risk includes risk of adverse smoke impacts. Identify and / or confirm sensitive receptors during this time-constrained phase of the decision-making process: Plot your WFU event on the map. Draw a 100-mile radius around the fire. Perform a quick inventory of the following: (1) residential health care facilities including group homes as well as nursing homes and hospitals; (2) public roadways; (3) residents / communities; (4) airports, especially if they are uncontrolled, communication towers; (5) active mines / private lands; (6) nonattainment areas; (7) outfitting / dude ranches; (8) summer camps / recreational areas , especially places children may gather in the season the fire is burning, heavily visited views like vistas in a National Park, etc. Knowledge of these sensitive receptors provides a quick and useful assessment of the relative risk of potential smoke impacts.

When using the four-step Wildland Fire Relative Risk Assessment tool, understand that under Part 1 Value Assessment - "Social/Economic Concerns" includes, in part, (1) degree of public support for the WFU program; (2) air quality regulatory requirements; and (3) public tolerance of smoke.

Is there other proximate fire activity that limits or precludes successful management of this fire?

**DEQ NOTE:** Consider the cumulative effects of all smoke. Would

Yes	No
	✓
	✓
	✓
	✓

*including this WFU candidate into an existing WFU complex tip the scales away from reasonable management under predicted conditions? How about under unstable meteorological conditions when potential exists for large fire growth?*

**Are there other Agency Administrator issues that preclude wildland fire use?**

**DEQ NOTE:** *Other issues may involve air quality, e.g. poor dispersion, ambient standards violations, burn bans, permit issues, etc. Agency Administrators should consider the effects of smoke on public health as an issue that may preclude WFU candidate approval.*

	✓

The Decision Criteria Checklist is a process to assess whether or not the situation warrants continued wildland fire use implementation. A "Yes" response to any element on the checklist indicates that the appropriate management response should be suppression-oriented.

Approved Response Action (check one)		Signature/Position	Date
Suppression Response			
Wildland Fire Use Response	✓	<i>Agency administrator's signature here</i>	<i>8/26/08</i>

**Justification for Suppression Response:**

---



---



---



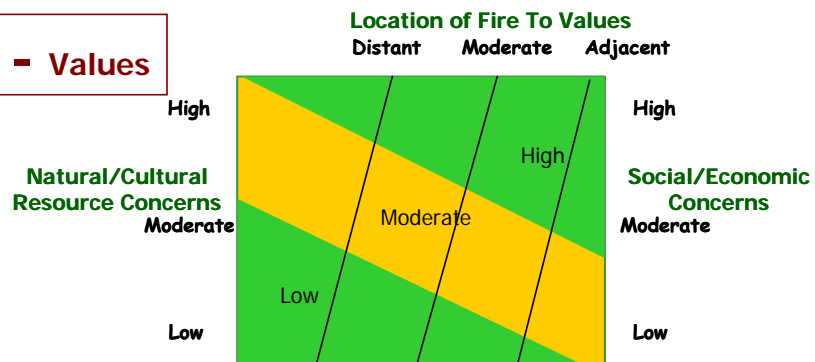
---



---

# Wildland Fire Relative Risk Assessment

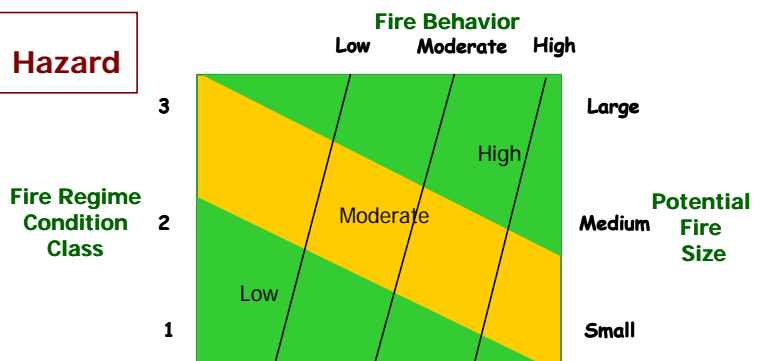
## 1 - Values



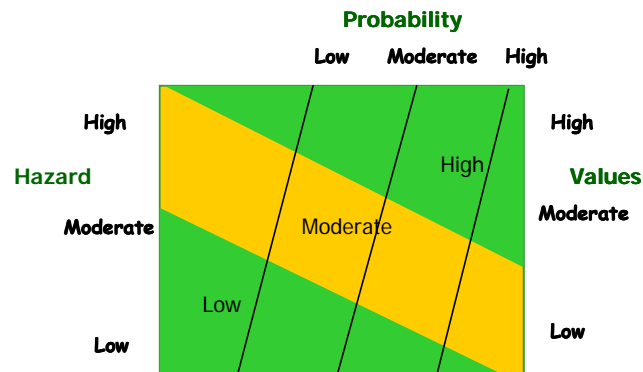
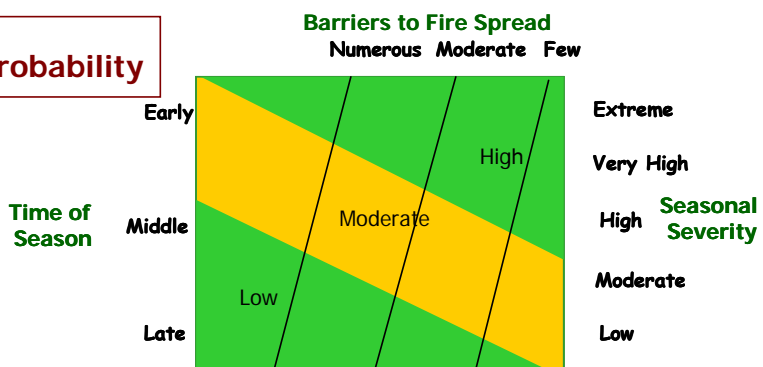
## Wildland Fire Relative Risk Assessment

## 4 - Relative Risk

## 2 - Hazard



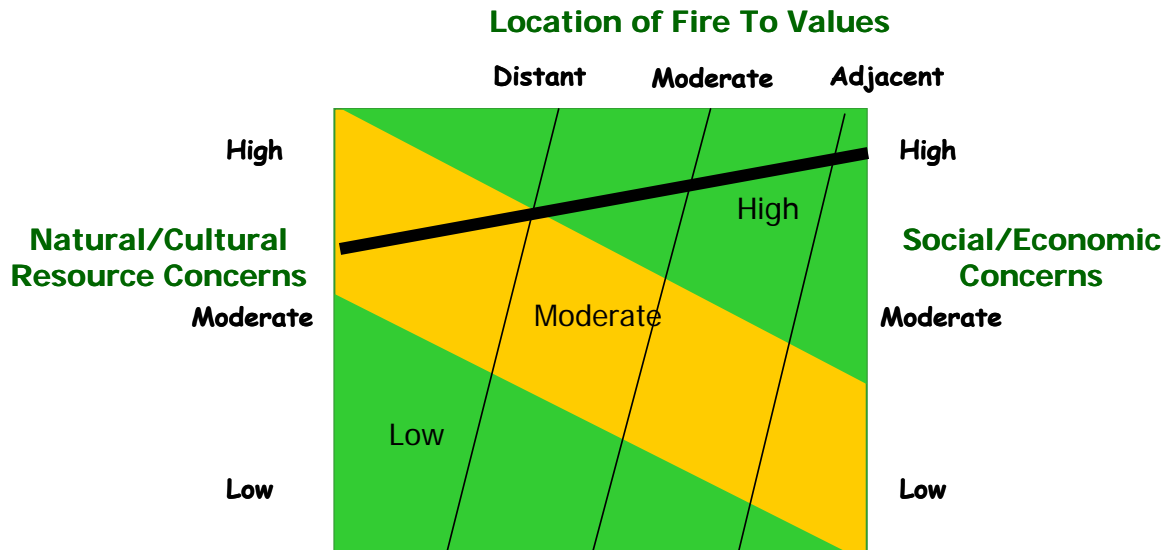
## 3- Probability



**Complete Steps 1 -3:** Connect the left and right variables with a line. At the top of the chart, select the appropriate value; follow the line beneath this value down to its intersection with the line connecting the left and right variables. Take results as inputs to Step 4.

**Complete Step 4:** Read the relative risk from the background area where the intersection occurs.

## Wildland Fire Relative Risk Assessment: Step 1: Determining Values



Connect the left and right values with a line. At the top of the chart, select the appropriate value; follow the line beneath this value down to its intersection with the line connecting the left and right variables. Read the Value Assessment from the background area where the intersection occurs.

**Notes:** *“Smoke from the Moors Mountain WFU candidate may affect sensitive features such as Interstate 15, residential roadways, and area ranch headquarters. To the south is Hogback Mountain which has many critical communication towers and the IMPROVE monitoring network. Therefore, the social / economic concern for smoke impacts is high. WFU candidate is located within the Gates of the Mountains Wilderness area which is a mandatory federal Class I Airshed. Therefore, it also has some social and cultural resource concerns regarding visibility protection and recreational values.”*

**PART 1: VALUE ASSESSMENT:** Values are those ecologic, social, and economic effects that could be lost or damaged because of a fire. Ecologic values consist of vegetation, wildlife species and their habitat, **air and water quality**, soil productivity, and other ecologic functions. Social effects can include life, cultural and historical resources, natural resources, artifacts, sacred sites. Economic values make up things like property and infrastructure, economically valuable natural and cultural resources, recreation, and tourism opportunities. This assessment area allows opportunity for the local agency administrator to identify particular local concerns. These concerns may be identified in the fire management plan or other planning documents.

- (1) **Natural/Cultural Resource Concerns** - key resources potentially affected by the fire. **Examples include, but are not limited to** habitat or populations of threatened, endangered, or sensitive species, water quality, erosion concerns, and invasive species.

Low	Moderate	High
<i>Resource concerns are few and generally do not conflict with management of the fire. Mitigation measures are effective.</i>	<i>Significant resource concerns exist, but there is little conflict with management of the fire. Mitigation measures are generally effective.</i>	<i>Multiple resource concerns exist, some of which may conflict with management of the fire. The effectiveness of needed mitigation measures is not well established.</i>

**DEQ NOTE:** The “Detailed Explanations of Decision Elements” section on Page 10 states that ... ‘objectives and constraints include air quality and effects on natural and cultural resources, as applicable.’ Concern for the air resource may be characterized as visibility impacts on scenic vistas and/or smoke impacts on private property or other values.

- (2) **Social/Economic Concerns** - the risk of the fire, or effects of the fire, impacting the social or economic concerns of an individual, business, community or other stakeholder involved with or affected by the fire. **Social concerns may include degree of support for the Wildland Fire Use program or resulting fire effects**, potential consequences to other fire management jurisdictions, impacts to tribal subsistence or gathering of natural resources, **air quality regulatory requirements and public tolerance of smoke**. Economic concerns may include potential financial impacts to property, business, or infrastructure. Infrastructure impacts may be costs to repair or replace sediment catchments, wildlife guzzlers, corrals, roads, culverts, power lines, domestic water supply intakes, and similar items.

Low	Moderate	High
<i>Local support for wildland fire use is high. The fire should have little or no impact on subsistence or tribal activities involving treaty rights. The fire is expected to remain within a single jurisdiction or agreements are in place to allow the fire to move across several jurisdictions. Media coverage is favorable. Few structures or business ventures are potentially affected by the fire. There are few impacts to recreation and tourism.</i>	<i>Local support of wildland fire use is clearly divided between supporters and opponents. The fire will have some impacts on subsistence or tribal activities involving treaty rights. The fire is expected to involve more than one jurisdiction, cooperator, or special interest group and agreements need to be developed. Media coverage tends to be a mix of favorable and unfavorable views. Some structures may be threatened by the fire or some business ventures have been affected by the fire.</i>	<i>Local support for wildland fire use is low. The fire will have significant impacts on subsistence activities or tribal activities involving treaty rights. <b>Smoke impacts may become a concern for higher level air quality regulatory agencies.</b> The fire is expected to involve several jurisdictions, cooperators, and special interest groups and agreements requiring significant negotiation need to be developed. Media coverage tends to be unfavorable. Many structures or private properties could be threatened.</i>

**DEQ NOTE:** Concern for smoke impacts on public health is typically tied to four things: (1) concentration of smoke; (2) duration of smoke; (3) frequency of occurrence, and (4) proximity to people. To keep regulatory agencies and the public informed and to help people who live and work where it may be smoky to protect their own health, you need

to conduct some level of analysis, either qualitative or quantitative, to communicate this information. For air quality purposes, the success of your project is directly tied to this analysis and communication.

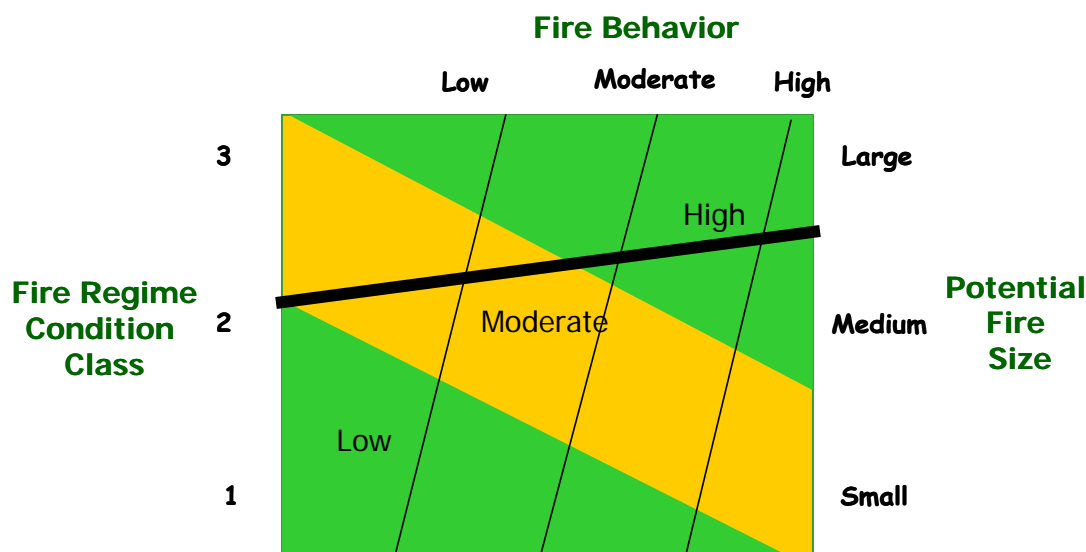
(3) **Location of Fire to Values:**

Distant	Moderate	Adjacent
<i>Fire location is not proximate to values to be protected or fire is located where it is highly unlikely that it would reach the values.</i>	<i>Fire location is moderately proximate to values. Location is such that, based on historical data, fire could potentially reach the values but will take multiple burning periods and sustained fire activity to reach the values.</i>	<i>Fire location is in close proximity to values. Without mitigation actions, fire will be expected to reach the values.</i>

**DEQ NOTE:** ‘Values’ are defined in both the “Wildland Fire Relative Risk Assessment” section on page 11 and in “Part 1 Value Assessment” Section on page 13. Values include air quality concerns. The distances are not measured and defined, rather they are relative and subjective, i.e., ‘Distant’; ‘Moderate’ and ‘Adjacent.’ You need to determine proximity the WFU candidate is to sensitive downwind features and develop an estimate of the concentration and duration of smoke and frequency of occurrence. When in doubt, conduct some level of analysis, either qualitative or quantitative, and communicate this information to the public and air regulators.

Additionally, think big. Smoke planning typically is done for prescribed fires, where impacts tend to be local and short-duration. If you think the fire may make a thousand-acre run some afternoon, what cities or other critical receptors are a hundred miles downwind? Also, when lofted smoke is heavy, it is more likely to be noticeable and problematic when it mixes down to the surface, as virtually all smoke eventually does. If during the day nearby receptors are spared due to instability, there may still be problems farther downwind. Then plan an information strategy that works that far away.

## Wildland Fire Relative Risk Assessment: Step 2: Determining Hazard



Connect the left and right values with a line. At the top of the chart, select the appropriate value; follow the line beneath this value down to its intersection with the line connecting the left and right variables. Read the Hazard Assessment from the background area where the intersection occurs.

**Notes:** *"The Moors Mountain WFU candidate has potential for large fire growth dependent upon strength of prevailing winds and position on south-southeast facing slopes. The FRCC is categorized as "2" with residual ground fuels generally classified as Fuel Model 8. The duration and frequency of fire movement may result in repeated smoke events that may have the potential to affect sensitive downwind features."*

**PART 2: HAZARD ASSESSMENT:** The hazard in wildland fire is made up of the conditions under which it occurs and exists, its ability to spread and circulate the intensity and severity it may present, and its spatial extent.

(1) **Current Fire Behavior** – the current fire behavior or that most recently observed. Changing fire behavior is addressed through repeated completion of the Periodic Fire Assessment.

Low	Moderate	High
<i>Short duration flaming front with occasional torching. Fuels are uniform and fire behavior can be easily predicted and tactics implemented.</i>	<i>Short range spotting occurring. Moderate rates of spread are expected with mainly surface fire and torching. Fuels and terrain are varied but don't pose significant problems in holding actions.</i>	<i>Long range spotting &gt; ¼ mile. Extreme rates of spread, and crown fire activity are possible. Fuels, elevation, and topography vary throughout the fire area creating high resistance to control.</i>

**DEQ NOTE:** Although 'Hazard Assessment' is often tied to fire intensity, severity, and spatial extent, consider also how smoke from large fire growth affects distant receptors. The WFU event itself may be contained within the MMA, but estimate and communicate the current and likely concentration, duration, and frequency of smoke impacts and how they may affect sensitive downwind receptors.

(2) **Fire Regime Condition Class** – a measure of ecological functions at risk based on changes in vegetation.

1	2	3
<i>Vegetative composition and structure are resilient and key components are at low risk of loss. Few, if any, fire return intervals have been missed and fuel complexes are similar to historic levels.</i>	<i>Both the composition and structure of vegetation has shifted towards conditions that are less resilient and more at risk of loss. Some fire return intervals have been missed, stand structure and composition, and fuel complexes have been altered and present potential for fires of severity and intensity levels in excess of historic levels.</i>	<i>The highly altered composition and structure of the vegetation predisposes the landscape to fire effects well outside the range of historic variability, potentially producing changed fire environments never before measured.</i>

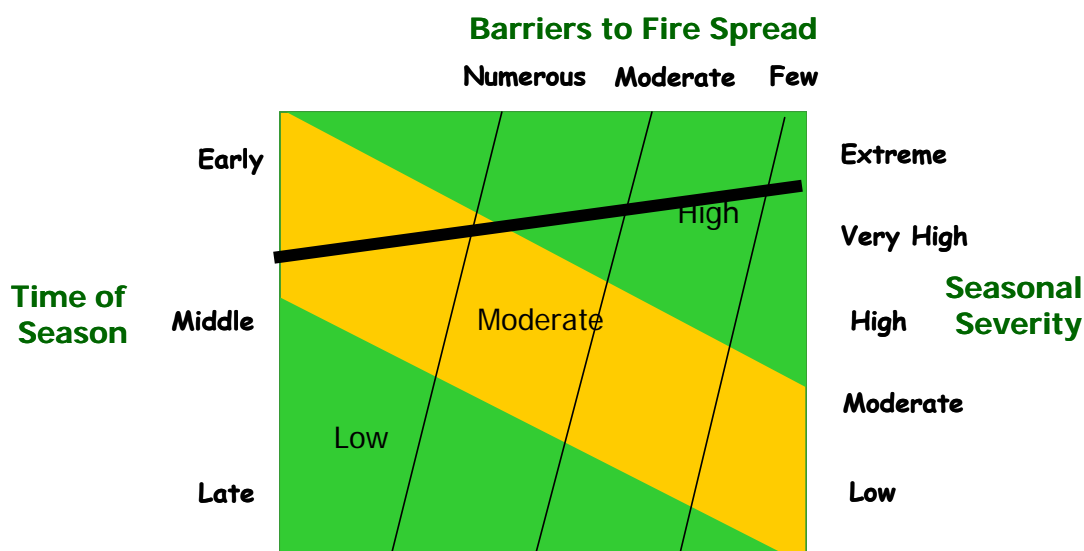
**DEQ NOTE:** WFU events burning in higher-order condition classes may cause more smoke. Assess when the potential exists for greater smoke production and factor that information into your hazard assessment. Also, while prescribed fire smoke planning typically needs to consider only surface and ground fuels, crowns may be involved in a WFU and produce additional smoke.

(3) **Potential Fire Size** - the potential fire size by the end of the season in comparison to historical fire occurrence.

Small	Medium	Large
<i>Fire size is expected to be small for the dominant fuel type involved</i>	<i>Fire size is expected to be in the mid-range for the dominant fuel type involved</i>	<i>Fire size is expected to be large for the dominant fuel type involved.</i>

**DEQ NOTE:** Potential fire size directly relates to the amount of smoke production. Larger WFU events have a higher probability for long-term smoke impacts at greater distances. Consider the effects of smoke on sensitive downwind receptors by potential fire size. Estimate and communicate the current and predicted concentration, duration, and frequency of smoke impacts and how they may affect sensitive downwind receptors. Finally, document your expectations about the implications that burning is likely to continue at some level all night, so drainage smoke may be heavier than is typical for a similar-size prescribed fire.

## Wildland Fire Relative Risk Assessment: Step 3: Determining Probability



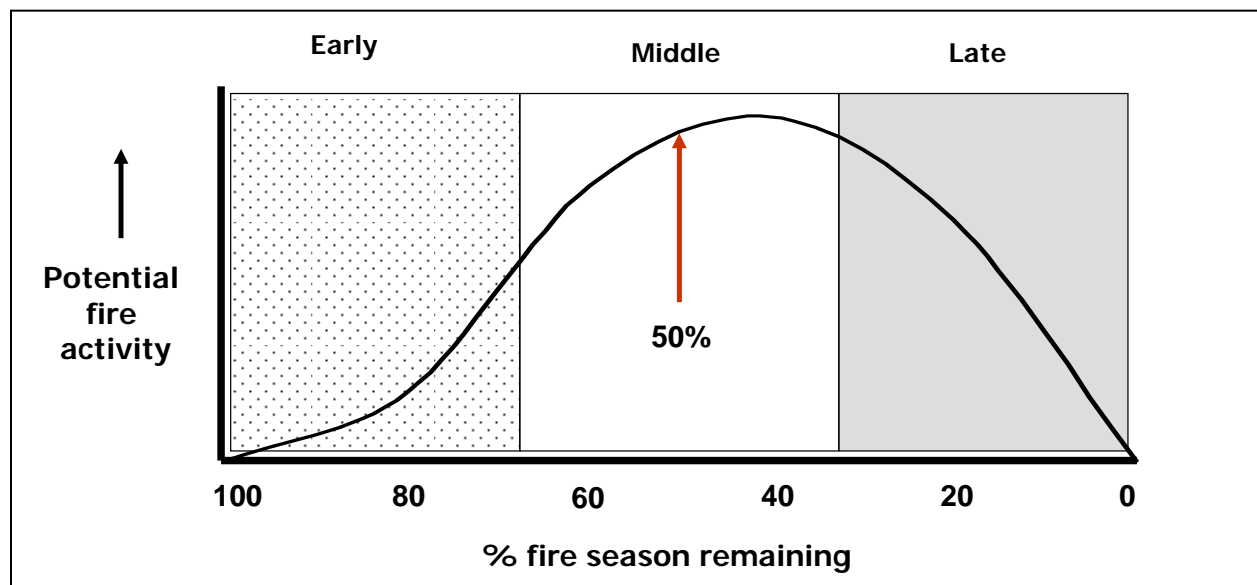
Connect the left and right values with a line. At the top of the chart, select the appropriate value; follow the line beneath this value down to its intersection with the line connecting the left and right variables. Read the Probability Assessment from the background area where the intersection occurs.

**Notes:** *"The Moors Mountain WFU event candidate is expected to continue burning during atmospheric conditions conducive to large fire growth. The probability of this event having the potential to adversely affect "values" is considered high. The concentration, duration, and frequency of smoke have the potential significantly to affect sensitive downwind receptors."*

**PART 3: PROBABILITY ASSESSMENT:** Probability refers to the likelihood of a fire becoming an active event having potential to adversely affect values.

(1) **Time of Season** - the current time in relation to the historical fire season. The chart below the guidelines reinforces the importance of time of season. During the early part of the fire season, the peak of burning activity is still to come, thus the fire could present substantial variation in behavior and activity. In the middle of the season, the peak of burning activity may or may not have occurred while in the late part of the season, the peak of fire activity generally has occurred and managers can reasonably expect diminishing fire activity and behavior as time progresses. As the amount of fire season remaining decreases or as the time of season progresses from early to late, management concerns and issues associated with potential fire activity decrease.

Early	Middle	Late
<i>The current date is in the early portion of the historic fire season, at least 2/3 of the established fire season remains and the peak of burning activity is still to come.</i>	<i>The current date is in the middle of the historic fire season, at least 1/3 of that period has passed and no less than 1/3 remains. The peak burning activity period either has occurred, is occurring now, or will occur very soon.</i>	<i>The current date is in the latter part of the historic fire season. At least 2/3 of the historic period has passed, the peak burning activity period has occurred, and the probability of a season-ending or fire-ending event is increasing quickly.</i>



**DEQ NOTE:** The likelihood of a WFU event spreading aggressively also involves the likelihood of smoke affecting sensitive receptors. Early- to middle-season events may have greater potential for large fire growth and subsequent smoke impacts. On the other hand, late-season weather is likely to disperse smoke less effectively. Consider smoke management by estimating and communicating the current and predicted concentration, duration, and frequency of smoke impacts and how they may affect sensitive downwind receptors.

(2) **Seasonal Severity** - a measure of the potential burning conditions as expressed by factors such as ERC, drought status, live fuel moistures, dead fuels moistures, soil moisture, stream discharge, and similar types of measures.

Low	High	Extreme
<i>Measures of fire danger are below to somewhat above seasonal averages. Drought status is within seasonal norms with no long-term drought present</i>	<i>Measures of fire danger are well above seasonal averages but not setting new records. The area is in short-term drought (1-2 years of drought) but not considered to be in long-term drought.</i>	<i>Measures of fire danger are setting new records. The area is considered to be in long-term drought (3 or more years of drought).</i>

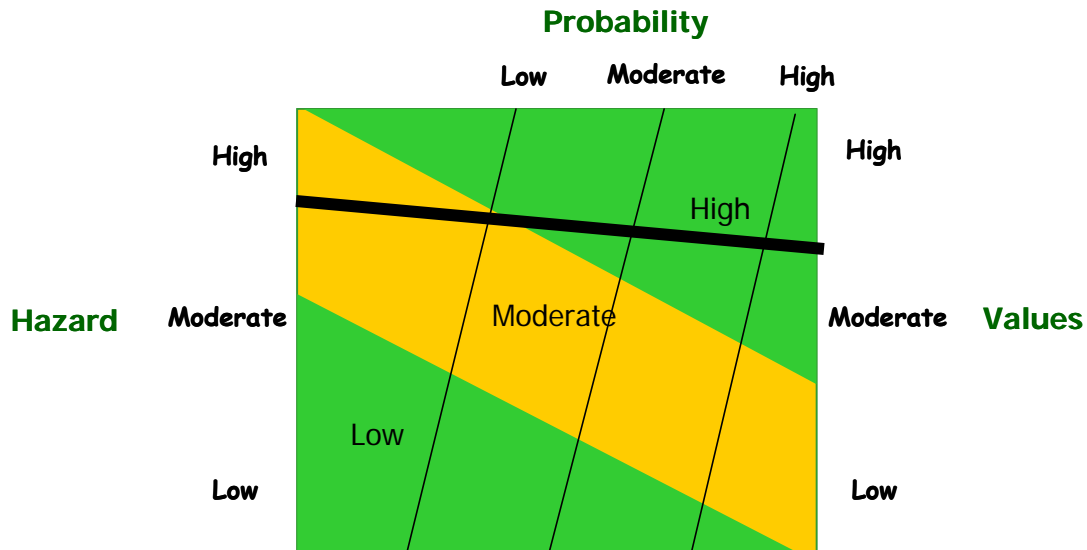
**DEQ NOTE:** Seasonal severity directly relates to potential fire size and to the amount of smoke production. WFU events burning under extreme severities have a higher probability for long-term smoke impacts at greater distances. Not only do they burn more acres, but also they tend to consume more fuel per acre, especially duff, litter, and heavies. Correlate seasonal severity with smoke management and estimate and communicate the current and predicted concentration, duration, and frequency of smoke impacts and how they may affect sensitive downwind receptors.

(3) **Barriers to Fire Spread** - a measure of the natural defensibility of the fire location and an indication of degree of potential mitigation actions needed.

Numerous	Moderate	Few
<i>The location of the fire and presence of natural barriers and fuel breaks limit the horizontal fuel continuity, minimal mitigation actions on-the-ground will be needed.</i>	<i>The location of the fire and presence of some natural barriers and fuel breaks limit the horizontal fuel continuity on some, but not all fire flanks, some mitigation actions on-the-ground will be needed to protect threats to boundaries and sensitive areas.</i>	<i>The location of the fire and presence of only limited natural barriers and fuel breaks will permit fire spread across continuous fuels. Mitigation actions on-the-ground will be needed but are expected to be effective.</i>

**DEQ NOTE:** Barriers to fire spread directly relate to potential fire size and smoke production. Fewer barriers allow for larger fire growth. You should correlate the potential for large fire growth with smoke management and estimate and communicate the current and predicted concentration, duration, and frequency of smoke impacts and how they may affect sensitive downwind receptors.

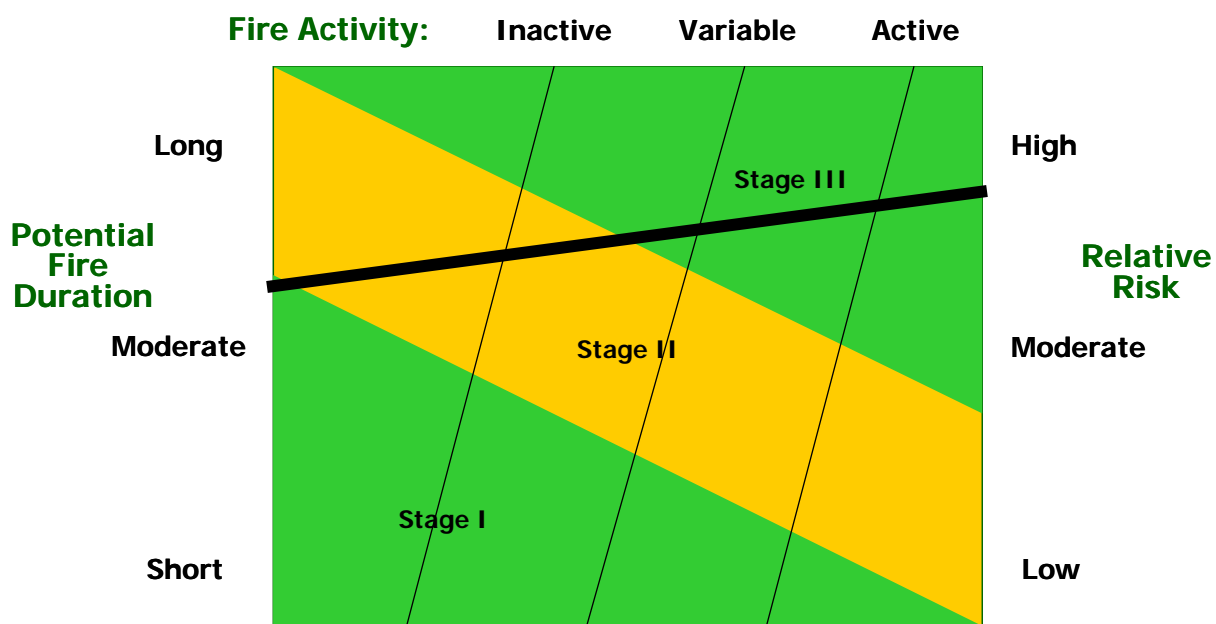
## Wildland Fire Relative Risk Assessment: Step 4: Determining Wildland Fire Relative Risk



Connect the left and right values with a line. At the top of the chart, select the appropriate value; follow the line beneath this value down to its intersection with the line connecting the left and right variables. Read the Relative Risk from the background area where the intersection occurs.

**Notes:** *"The Moors Mountain WFU event candidate has a 'high' relative risk based upon an assessment of various decision criteria that included potential impacts from smoke."*

# Planning Needs Assessment Chart



To complete the chart, connect the left and right variables with a single line (potential fire duration and relative risk, respectively). Select the appropriate level of fire activity at the top of the chart and follow the line beneath that value down to its intersection with the line connecting the left and right variables. Read the planning need from the background area where the intersection occurs. The Relative Risk values are those obtained from the Wildland Fire Relative Risk Assessment process (Wildland Fire Relative Risk Assessment).

**Minimum** interagency qualification requirements for wildland fire use planning at each stage of the WFIP process. This information should be used with the Planning Needs Assessment Chart to determine appropriate levels of planning qualifications. Higher qualified personnel can always be used to complete the various planning levels if desired. Duty Officer qualifications are defined in local unit Fire Management Plans.

WFIP Stage	Minimum Planning Qualifications
WFIP Stage I	Unit Duty Officer
WFIP Stage II	Fire Use Manager Type 2 (FUM2)
WFIP Stage III	Fire Use Manager Type 2 (FUM2)

## Guidelines for Planning Needs Assessment Chart.

- (1) **Potential Fire Duration** – the estimated length of time that the fire may continue to burn in comparison to historical fire durations and amount of fire season available for a given area.

Short	Moderate	Long
<i>Fire is expected to persist for only the shortest time in comparison to historical fire durations. This may be as short as only a few days. Fuels may be limiting, weather may be limiting, or time of fire season may be limiting. Generally, this could be referenced as less than the historical average fire length for a given area.</i>	<i>Fire is expected to last for a time period similar to the historical average length of fires.</i>	<i>Fire is expected to last for a time period longer than the historical average length of fires.</i>

**DEQ NOTE:** Longer term WFU events generally correlate to early- to mid-season events with potential for large fire growth. The longer the event duration, the more smoke emissions produced. Not all smoke generated from a WFU event will affect sensitive receptors. Therefore, you need to estimate and communicate the current and predicted concentration, duration, and frequency of smoke impacts and how they may affect sensitive downwind receptors.

- (2) **Relative Risk** – a measure of the relative risk, determined directly from the Wildland Fire Relative Risk Assessment, so no range of values is listed here.

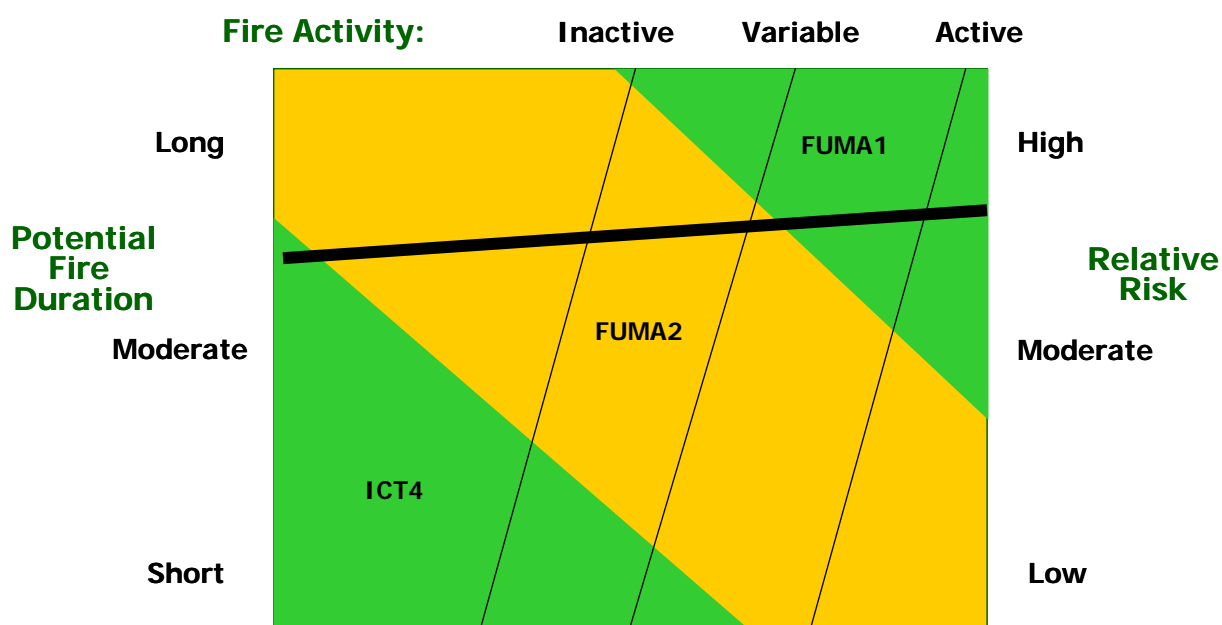
**DEQ NOTE:** The relative risk was determined to be high based upon, in part, current and predicted smoke impacts to sensitive downwind receptors.

- (3) **Fire Activity** - the relative activity of the fire in terms of intensity and spread over time.

Inactive	Variable	Active
<i>Fire is burning with very low intensity, little or no spread, and little or no increase in burned area. Fire is confined to surface litter and duff layers.</i>	<i>Fire is burning predominantly in surface litter and duff layers, with low intensity and little or no spread but has occasional periods of increased intensity and spread. Growth of burned area is not constant but occurs in response to increased activity. Area increase may be static for moderately long periods and then increase for short periods. Fire size usually increases by less than 50% during active periods.</i>	<i>Fire is burning in all fuel strata (litter, surface, and crown) with periods of sustained flaming fronts, perimeter growth, and area increases that can exceed 100% at times. Infrequent periods of low activity occur but spread is generally constant.</i>

**DEQ NOTE:** Fire activity correlates with severity and seasonality. Higher fire activity generally means greater smoke production and greater opportunity for impacts to sensitive receptors. You must estimate and communicate the current and predicted concentration, duration, and frequency of smoke impacts and how they may affect sensitive downwind receptors.

# Fire Use Manager Decision Chart



To complete the chart, connect the left and right variables with a single line (potential fire duration and relative risk, respectively). Select the appropriate level of fire activity at the top of the chart and follow the line beneath that value down to its intersection with the line connecting the left and right variables. Read the level of Fire Use Manager needed directly from the background area where the intersection occurs. The Relative Risk values are those obtained from the Wildland Fire Relative Risk Assessment process (Wildland Fire Relative Risk Assessment).

**Minimum** level of implementation qualifications. During implementation, as fire activity and management needs escalate, implementation qualification needs ascend to a higher level. But as conditions moderate and management needs drop, implementation qualifications can descend to lower levels. Table 3 and Figure 8 are used jointly as fire situations and conditions escalate; when conditions are moderating or lessening, Figure 8 provides the necessary qualification levels for implementation.

WFIP Stage	Minimum Implementation Qualifications (Use Fire Use Manager Decision Chart to determine recommended position)
WFIP Stage I	Incident Commander Type 4 (ICT4) ( <b>must have local knowledge or prior experience in implementing WFIPs and managing wildland fire use events</b> )
WFIP Stage II	Fire Use Manager Type 2 (FUM2)
WFIP Stage III	Fire Use Manager Type 2 (FUM2)

## Guidelines for Fire Use Manager Decision Chart.

- (1) **Potential Fire Duration** – the estimated length of time that the fire may continue to burn in comparison to historical fire durations and amount of fire season available for a given area.

Short	Moderate	Long
<i>Fire is expected to persist for only the shortest time in comparison to historical fire durations. This may be as short as only a few days. Fuels may be limiting, weather may be limiting, or time of fire season may be limiting. Generally, this could be referenced as less than the historical average fire length for a given area.</i>	<i>Fire is expected to last for a time period similar to the historical average length of fires.</i>	<i>Fire is expected to last for a time period longer than the historical average length of fires.</i>

**DEQ NOTE:** Longer term WFU events generally correlate to early- to mid-season events with potential for large fire growth. The longer the event duration, the more smoke emissions produced. Not all smoke generated from a WFU event will affect sensitive receptors. Therefore, you need to estimate and communicate the current and predicted concentration, duration, and frequency of smoke impacts on sensitive downwind receptors.

- (2) **Relative Risk** – a measure of the relative risk, determined directly from the Wildland Fire Relative Risk Assessment, so no range of values is listed here.

**DEQ NOTE:** The relative risk was determined to be high based upon, in part, current and predicted smoke impacts to downwind sensitive receptors.

- (3) **Fire Activity** - the relative activity of the fire in terms of intensity and spread over time.

Inactive	Variable	Active
<i>Fire is burning with very low intensity, little or no spread, and little or no increase in burned area. Fire is confined to surface litter and duff layers.</i>	<i>Fire is burning predominantly in surface litter and duff layers, with low intensity and little or no spread but has occasional periods of increased intensity and spread. Growth of burned area is not constant but occurs in response to increased activity. Area increase may be static for moderately long periods and then increase for short periods. Fire size usually increases by less than 50% during active periods.</i>	<i>Fire is burning in all fuel strata (litter, surface, and crown) with periods of sustained flaming fronts, perimeter growth, and area increases that can exceed 100% at times. Infrequent periods of low activity occur but spread is generally constant.</i>

**DEQ NOTE:** Fire activity correlates with severity and seasonality. Higher fire activity generally means greater smoke production and greater opportunity for impacts to sensitive receptors. You must estimate and communicate the current and predicted concentration, duration, and frequency of smoke impacts and how they may affect sensitive downwind receptors.

**Management Actions:**

Forecasted Weather (Include an initial assessment of air quality forecasts / allowable burn days as applicable)	<b><u>DEQ NOTE:</u></b> Understanding atmospheric dispersion of smoke is the foundation for understanding the current and predicted concentration, duration, and frequency of smoke impacts. Evaluate weather both in terms of fire severity AND smoke dispersion.
Forecasted Fire Behavior	<b><u>DEQ NOTE:</u></b> Smoke production is correlated to fire behavior. Be aware of the current and predicted smoke impacts while analyzing for fire growth and behavior.
Hazards and Safety Concerns	<b><u>DEQ NOTE:</u></b> Safety concerns include visibility impacts on public roadways, airports, communication towers, etc. They also include public health, not only for active adults but also for people whose breathing is compromised by disease or, as for a child or expectant mother, challenged by rapid growth. Understand of both current and predicted smoke impacts on sensitive downwind receptors.
Management Actions	<b><u>DEQ NOTE:</u></b> Smoke must be mitigated by following Best Available Control Techniques (BACT) such as: (1) Curtailing WFU burnout ignitions and scheduling burnout operations during unstable meteorological conditions; (2) Increasing WFU ignitions and hastening fuel consumption through the application of additional management-ignited fire; (3) directing suppression tactics through appropriate management response; and/or (4) prohibiting approval of any new WFU candidates.
Availability of Resources	<b><u>DEQ NOTE:</u></b> Evaluate the availability of people who will adequately estimate and communicate the current and predicted concentration, duration, and frequency of smoke impacts on sensitive downwind receptors. This may be assigned to an individual or delegated to a team.

## Periodic Fire Assessment

Insert the following sections, either by completing new versions or by using those already completed as part of the WFIP Stage I:

- Decision Criteria Checklist
- Wildland Fire Risk Assessment
  - Part 1: Planning Needs Assessment
  - Part 2: Fire Use Manager Decision Chart
- Signature Page

# Periodic Fire Assessment

## SIGNATURE TABLE

Assessment Frequency

Valid Date(s)

Name/Title	Date	Decision Criteria Checklist Valid	WFIP Planning Stage Required	Fire Use Manager Level
		Y/N	I,II,III	I, II, Other
<p><b><u>DEQ NOTE:</u></b> A line officer's signature certifies the person has conducted a complete, periodic fire assessment at a pre-defined assessment frequency. Complete assessment includes fully evaluating current and predicted smoke impacts.</p> <p>The assessment frequency is based upon fire activity, external attention, or other critical concerns. For many WFUs, smoke management is a critical concern. Establish an assessment frequency that is sufficient for evaluating current and predicted smoke impacts on sensitive downwind receptors.</p>				

## WFIP Stage II:

Attach Stage I information.

### *Objectives:*

Objectives	<b><u>DEQ NOTE:</u></b> “Objectives,” as discussed on Page 27, are ‘...very well-defined statements that describe what one or more wildland fires must accomplish to meet resource management objectives, as stated in land and resource management plans.’ Include smoke management as a specific objective. Monitor the effects of smoke impacts on sensitive downwind receptors. Effective monitoring of smoke impacts from any large fire requires getting miles away from the incident. Pictures useful for evaluating impacts are of the end of the visible plume, not its base. The most accurate evaluation of community impacts is based on direct observation, and conversations with residents and businesspeople. Consider current and predicted smoke management under ‘threats’ or ‘safety considerations’ or ‘external concerns’ for evaluation purposes.
------------	--

### *Fire Situation:*

Current and Predicted Weather	<b><u>DEQ NOTE:</u></b> Atmospheric dispersion of smoke has everything to do with understanding the current and predicted concentration, duration, and frequency of smoke impacts. You should evaluate weather in terms of both fire severity AND smoke dispersion.
Current and Predicted Fire Behavior	<b><u>DEQ NOTE:</u></b> Smoke production is correlated to fire behavior. You should be aware of the current and predicted smoke impacts while analyzing for fire growth and behavior.
Threats	<b><u>DEQ NOTE:</u></b> Planning for “threats,” as defined on page 35, involves anticipating and predicting where the fire may move, what it may affect, and designing a strategy to minimize or eliminate those impacts. Smoke is specifically identified as a threat to be identified and mitigated. You should identify sensitive downwind receptors out to a minimum 50 miles and conduct qualitative or quantitative analysis to estimate and communicate current and predicted concentration, duration, and frequency of smoke impacts.
Safety Considerations	<b><u>DEQ NOTE:</u></b> Safety concerns include visibility impacts on public roadways, airports, communication towers, etc. You should have an understanding of both current and predicted smoke impacts on sensitive downwind receptors.

Environmental Concerns	<b><u>DEQ NOTE:</u></b> Besides protecting public health from smoke impacts, you should be aware of the environmental concerns of smoke to public 'welfare.' Public welfare includes plants, animals, and property.
External Concerns	<b><u>DEQ NOTE:</u></b> External concerns, in part, involve socio-political issues related to smoke management. Examples of external smoke management issues are standards exceedances, visibility impairment, public roadway safety, nuisance from odor and ash fall, recreation limitations, commercial/business limitations, etc. You should be aware of how smoke management affects sensitive downwind features and plan for mitigation strategies. Be prepared to communicate your chosen smoke reduction techniques to the public and air regulators.

### ***Management Actions:***

Management Actions	<b><u>DEQ NOTE:</u></b> You should understand smoke must be mitigated by following Best Available Control Techniques (BACT): (1) Curtailing WFU burnout ignitions and scheduling burnout operations during unstable meteorological conditions; (2) increasing WFU ignitions and hastening fuel consumption through the application of additional management-ignited fire; (3) directing suppression tactics through appropriate management response; and/or (4) prohibiting approval of any new WFU candidates.
--------------------	---

### ***Estimated Costs:***

Estimated Costs	<b><u>DEQ NOTE:</u></b> Include the cost of conducting ambient air quality monitoring. If the fire or its impacts are substantial, it may be necessary to assign someone full-time to understand and communicate about air quality issues to the public and air regulators. The benefits of these up-front costs may be realized in the form of reduced resources spent rebuilding a community's confidence in a well-managed fire program, defending questionable actions and/or smoke impact damage claims.
-----------------	---

## Periodic Fire Assessment

Insert the following sections, either by completing new versions or by using those already completed as part of the WFIP Stage I:

- Decision Criteria Checklist
- Wildland Fire Risk Assessment
  - Part 1: Planning Needs Assessment
  - Part 2: Fire Use Manager Decision Chart
- Signature Page

# Periodic Fire Assessment

## SIGNATURE TABLE

Assessment Frequency

Valid Date(s)

Name/Title	Date	Decision Criteria Checklist Valid	WFIP Planning Stage Required	Fire Use Manager Level
		Y/N	I,II,III	I, II, Other
<p><b><u>DEQ NOTE:</u></b> <i>If you are a line officer whose signature essentially certifies that you have conducted a complete, periodic fire assessment according to a pre-defined assessment frequency, then ensure that you have fully evaluated potential smoke impacts.</i></p> <p><i>The assessment frequency is based upon fire activity, external attention, or other critical concerns. You should always consider smoke management as a critical concern and establish an assessment frequency based upon current and predicted smoke impacts on sensitive downwind receptors.</i></p>				

## WFIP Stage III:

Attach Stage I and Stage II information. Update and/or revise Stage I and II as necessary.

### *Objectives:*

Natural and Cultural  
Resource Objectives

**DEQ NOTE:** “Objectives,” as discussed on Page 27, are ‘...very well-defined statements that describe what one or more wildland fires must accomplish to meet resource management objectives, as stated in land and resource management plans.’ You should continue to include smoke management as a specific objective and monitor the effects of smoke impacts on sensitive downwind receptors. Consider current and predicted smoke management under ‘threats’ or ‘safety considerations’ or ‘external concerns’ for evaluation.

Constraints

**DEQ NOTE:** Larger and longer-burning WFU events have greater risk of smoke production and impacts on sensitive downwind receptors. You should be aware of all sensitive downwind receptors as potential constraints on large fire growth. Smoke impacts may trigger external socio-political concerns. You must estimate and communicate the concentration, duration, and frequency of smoke impacts on sensitive downwind receptors.

### *Maximum Manageable Area (MMA) – Definition and Maps*

Acres in MMA:

Definition of MMA:

Attach Map of MMA

**DEQ NOTE:** An MMA delineates the geographic extent of the fire area in order to meet resource objectives AND accommodates social, political, and resource impacts. Large MMAs allow for large fire growth and more smoke production. In their analyses, regulatory agencies must consider not only the most likely final fire size but also the maximum area ELIGIBLE for fire consumption and the smoke produced from those areas. Establish MMA boundaries that reflect your organizations’ capacity to either avoid or manage smoke production that may exceed legal smoke limits.

### *Weather Conditions and Drought Prognosis*

Weather  
Conditions/Drought:  
Discussion and  
Prognosis

**DEQ NOTE:** Atmospheric dispersion of smoke has everything to do with understanding the current and predicted concentration, duration, and frequency of smoke impacts. You should evaluate weather in terms of both fire severity AND smoke dispersion.

### ***Long-term Risk Assessment and Map (if applicable)***

**Risk Assessment**  
(Describe techniques utilized and outputs, include maps as appropriate)

**DEQ NOTE:** Long-term analysis is critical in the development of mitigation strategies and actions that, in part, is targeted at smoke management. Using techniques to better understand smoke concentration, duration, and frequency for consideration in decision-making promotes better management choices and, ultimately, more desirable outcomes. Specific assessments include the probability of adverse smoke events and dispersal.

### ***Threats***

**Threats to MMA**

**DEQ NOTE:** : You should establish an MMA to delineate the geographic extent of the fire area in order to meet resource objectives AND accommodate social, political, and resource impacts. Large MMAs allow for large fire growth and more smoke production. You must be aware that regulatory agencies take into consideration the maximum area ELIGIBLE for fire consumption and the smoke produced from those areas in their regulatory analyses. You should only establish MMA boundaries to the extent the current and predicted smoke production is within your resources to manage if such WFU event exceeded legal smoke limits.

**Threats to Public Use and Firefighter Safety**

**DEQ NOTE:** Ibid.

**Smoke Dispersion and Effects**

**DEQ NOTE:** Atmospheric dispersion of smoke has everything to do with understanding the current and predicted concentration, duration, and frequency of smoke impacts. You should evaluate smoke dispersion using all available resources such as Bluesky Rains to predict WFU event AND wildfire smoke impacts. Bluesky Rains may have value in predicting long-range transport of smoke, but that evaluation of impacts within a few dozen miles of the fire must rely on other tools - mostly logic and experience.

**Other Threats**

**DEQ NOTE:** "Threats" as defined on page 35 involves anticipating and predicting where the fire may move and what it may affect, and designing a strategy to minimize or eliminate those impacts. Smoke is specifically

identified as a threat to be identified and mitigated. You should identify sensitive downwind receptors out to a minimum 50 miles and conduct qualitative or quantitative analysis to estimate and communicate current and predicted concentration, duration, and frequency of smoke impacts.

### ***Monitoring Actions***

Describe Monitoring Actions, Frequency, Duration

**DEQ NOTE:** Monitoring actions mean a constant evaluation of current and predicted conditions that must include smoke management. Monitoring is useful to document smoke concentration, duration, and frequency. Monitoring frequency for smoke management should be ongoing. You should ensure that monitoring includes an analysis of smoke management because that information will be analyzed and archived as part of both your current real-time management decisions and for the final documentation package.

### ***Mitigation Actions***

Describe Holding Actions and Other Mitigation Actions, and Management Action Points that initiate these actions, and Key to Map if necessary

**DEQ NOTE:** You must manage smoke concentration, duration, and frequency to minimize the risks of adverse consequences. That involves (1) identifying mitigation strategies for reducing smoke; and (2) implementing mitigation strategies as needed. Management actions to reduce impacts from smoke should be clearly identified in the Stage III analysis.

### ***Resources Needed to Manage the Fire Under Expected Weather Conditions***

Describe resources necessary to accomplish ignition, holding, other mitigation actions, and monitoring actions

**DEQ NOTE:** Similar to conducting management-ignited activities, WFU event ignition, holding, and monitoring strategies must have adequate resources to successfully implement management goals. You should consider the effects of smoke following any management ignitions and estimate the current and predicted impacts to sensitive downwind features.

### ***Contingency Actions***

Describe Contingency actions, management action points that initiate them,

**DEQ NOTE:** Contingency actions and Management Action Points (MAPs) are critical features in adequately addressing smoke management. You should develop

resources needed, etc.

*contingency action and MAPs specifically related to potential smoke impacts. These contingency actions and MAPs should be associated with pre-identified emission reduction techniques to mitigate those impacts. These pre-identified actions speak favorably toward your understanding and sensitivity regarding smoke impacts. An example MAP point for smoke management should mainly be applicable to an off-site location determined to be a sensitive feature; e.g. a community, roadway, Class I Airshed, airport, etc. The action should be to consider emission reduction techniques along with the appropriate resources needed to minimize smoke impacts. This MAP point will be invaluable during public meetings.*

### ***Information Plan***

Describe Information Plan, Contacts, Responsibilities, etc.

**DEQ NOTE:** *Communication and education of all agency personnel is crucial to successful program implementation. Include the following positions in your agency contact list for all affected counties within smoke impact range: county health officers; county sanitarians; county/local fire districts, and state/county air quality representatives. You must establish and maintain proper contacts in order to facilitate ongoing and efficient communication and education activities. This includes speaking with the public and local elected officials.*

### ***Estimated Costs of Managing the Fire***

Describe costs in terms of resources needed, projected duration, etc.

**DEQ NOTE:** *You should consider the additional cost of conducting ambient air quality monitoring and employing an individual specifically tasked with understanding and communicating air quality issues to the public and air regulators. The benefits of these up-front costs may be realized in the form of reduced resources spent defending questionable actions and/or smoke impact damage claims.*

### ***Post-burn Evaluation***

Describe post-burn evaluation procedures, resource requirements, costs, duration, etc.

**DEQ NOTE:** *Post-burn evaluations must include an evaluation of smoke impacts. Include any comments, both positive and negative, regarding smoke management from the public and regulators. An evaluation of your compliance to applicable open burning permits or other regulations (smoke management) is a must. Your degree of accomplishment to stated*

*objectives on a project basis is, in part, tied to the success of larger smoke management goals.*

***Signatures***

**Include  
signatures/titles/  
dates for preparing,  
approving, and any  
concurring individuals**

**DEQ NOTE:** *If you are a line officer whose signature essentially certifies that you have conducted a complete assessment of the Stage III planning activities, you should ensure that adequate mitigation actions have been developed to reduce or eliminate threats to values, including air quality. These proposed actions will reduce the probability that fire behavior or fire effects will exceed acceptable limits – that includes current and predicted smoke impacts on sensitive downwind receptors. This approval does not constitute the Periodic Fire Assessment.*

## Periodic Fire Assessment

Insert the following sections, either by completing new versions or by using those already completed as part of the WFIP Stage I:

- Decision Criteria Checklist
- Wildland Fire Risk Assessment
  - Part 1: Planning Needs Assessment
  - Part 2: Fire Use Manager Decision Chart
- Signature Page

## SIGNATURE TABLE

**Valid Date(s)**

**DEQ NOTE:** If you are a line officer whose signature essentially certifies that you have conducted a complete, periodic fire assessment according to a pre-defined assessment frequency, then ensure that you have fully evaluated potential smoke impacts.

The assessment frequency is based upon fire activity, external attention, or other critical concerns. You should always consider smoke management as a critical concern and establish an assessment frequency based upon current and predicted smoke impacts to sensitive downwind receptors.

**END OF DOCUMENT**

**F:\CB7306\Word\Forest\_Health\Smoke\_Management\EXAMPLE WFIP 2008 06.doc**